

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions, and listings, of claims in the captioned patent application:

Listing of Claims:

Claims 1-20. (cancelled)

Claim 21. (Currently Amended) A printed circuit board (PCB) comprising:

- a printed wiring board;
- a plurality of components mounted on the printed wiring board; and
- an electrically continuous conformal EMI protective shield for adhering directly to and conforming with surfaces of a printed circuit board comprising:

- a thermally conductive dielectric coating adhering directly to surfaces of the printed circuit board and comprising a electrically nonconductive thermal loading material, thereby forming an electrically nonconductive, thermally conductive, contiguous and solid layer over all such printed circuit board surfaces; and

- a conductive coating adhering directly to surfaces of the dielectric coating to provide an electrically conductive layer that prevents electromagnetic emissions from passing through the conformal EMI protective shield.

Claim 22. (Previously Presented) The printed circuit board of claim 21, wherein the thermally conductive dielectric coating is formed from a thermally conductive dielectric dispersion comprising:

- a base liquid;
- a binder material suspended in the base liquid; and
- the electrically nonconductive thermal loading material suspended in the base liquid.

Claim 23. (Previously Presented) The printed circuit board of claim 21,

- wherein the thermal loading material comprises one of the group consisting of boron nitride (BN), aluminum oxide (AlO₃) and magnesium oxide (MgO).

Claim 24. (Previously Presented) The printed circuit board of claim 22, wherein the binder material comprises one of the group consisting of acrylic and urethane.

Claim 25. (Previously Presented) The printed circuit board of claim 22, wherein the base liquid and binder material are provided in an intermediate dispersion subsequently doped with the thermal loading material.

Claim 26. (Previously Presented) The printed circuit board of claim 22, wherein the base liquid is one of either water or an organic solvent.

Claim 27. (Previously Presented) The printed circuit board of claim 21, wherein the thermal loading material is 10%-80% and the binder is 90%-20% by weight of the thermally conductive dielectric dispersion.

Claim 28. (Previously Presented) The printed circuit board of claim 22, wherein the thermal loading material comprises a 0.1-10 micron boron nitride powder.

Claim 29. (Previously Presented) The printed circuit board of claim 21, wherein the thermal loading material comprises a 100 mesh, 99% corundum, alpha-phase aluminum oxide powder.

Claim 30. (Previously Presented) The printed circuit board of claim 21, wherein the thermally conductive dielectric coating has a viscosity of at least 45" #2 Zahn Cup (full body).

Claim 31. (Previously Presented) The printed circuit board of claim 21, wherein the thermally conductive dielectric coating has a viscosity in the range of 50-100" #2 Zahn Cup (full body).

Claim 32. (Previously Presented) The printed circuit board of claim 21, wherein the thermally conductive dielectric coating has an adhesion that enables it to pass the ASTM D-3359-97 Method A Tape Test using a 1" (25 mm wide) semi-transparent pressure-sensitive tape with an adhesion strength of 25-70 ounces per inch when tested in accordance with ASTM Test Method D-3330.

Claim 33. (Previously Presented) The printed circuit board of claim 21, wherein the thermally conductive dielectric coating has a thickness of approximately .0015 to .0020 inches.

Claim 34. (Previously Presented) The printed circuit board of claim 21, wherein the thermally conductive dielectric coating is formed from multiple applications each forming a layer of thermally conductive dielectric material having a thickness of approximately .001 inches.

Claim 35. (Previously Presented) The printed circuit board of claim 21, wherein said dielectric coating has a combination of viscosity and adhesion sufficient to enable said dispersion to be applied via atomization spray techniques.

Claim 36. (Previously Presented) The printed circuit board of claim 22, wherein said dielectric coating has a combination of viscosity and adhesion to prevent dewetting when said dielectric dispersion is applied to surfaces of the printed circuit board.

Claim 37. (Previously Presented) The printed circuit board of claim 21, wherein the thermal loading material has a conductivity of at least 20 W/mK.

Claim 38. (Previously Presented) The printed circuit board of claim 21, wherein the thermal loading material has a conductivity of at least 100 W/mK.

Claim 39. (Previously Presented) The printed circuit board of claim 22, wherein said suspension of said thermal loading material is substantially uniform when said dielectric dispersion is applied to said printed circuit board surfaces.

Claim 40. (Previously Presented) The printed circuit board of claim 26, wherein the organic solvent comprises one or more of the group consisting of:

- N-Methyl-Pyrolidinone (NMP);
- Methyl-Ethyl-Ketone (MEK);
- an acetone; and
- an alcohol.

Claim 41. (Previously Presented) The printed circuit board of claim 23, wherein said boron nitride comprises one or more of the group consisting of:

- hexagonal boron nitride; and
- diamond boron nitride.

Claim 42. (Previously Presented) The printed circuit board of claim 22, wherein said dispersion further comprises one or more of the group consisting of:

- at least one photosensitizing agent to enable said dispersion to be UV cured; and
- at least one heat-curing agent to enable said dispersion to be temperature cured.

Claim 43. (Previously Presented) The printed circuit board of claim 42, wherein said photosensitizing agent is a UV-curable acrylic.

Claim 44. (Previously Presented) The printed circuit board of claim 42, wherein said heat-curing agent is anhydride.

Claim 45. (Currently Amended) A printed circuit board comprising:

- a printed wiring board;
- a plurality of components mounted on the printed wiring board; and
- a solid thermally conductive dielectric coating adhered to surfaces of the printed circuit board and comprising an electrically nonconductive thermal loading material.

Claim 46. (Previously Presented) The printed circuit board of claim 45, wherein the printed circuit board further comprises:

- a conductive coating adhered to surfaces of the dielectric coating, wherein said conductive coating and said dielectric coating form an electrically continuous conformal EMI protective shield.

Claim 47. (Previously Presented) The printed circuit board of claim 45, wherein the thermally conductive dielectric coating is formed from a thermally conductive dielectric dispersion comprising:

- a base liquid;
- a binder material suspended in the base liquid; and

the electrically nonconductive thermal loading material suspended in the base liquid.

Claim 48. (Previously Presented) The printed circuit board of claim 45, wherein the thermal loading material comprises one of the group consisting of boron nitride (BN), aluminum oxide (AlO_3) and magnesium oxide (MgO).

Claim 49. (Previously Presented) The printed circuit board of claim 47, wherein the binder material comprises one of the group consisting of acrylic and urethane.

Claim 50. (Previously Presented) The printed circuit board of claim 47, wherein the base liquid and binder material are provided in an intermediate dispersion subsequently doped with the thermal loading material.

Claim 51. (Previously Presented) The printed circuit board of claim 47, wherein the base liquid is one of either water or an organic solvent.

Claim 52. (Previously Presented) The printed circuit board of claim 51, wherein the organic solvent comprises one or more of the group consisting of:

- N-Methyl-Pyrolidinone (NMP);
- Methyl-Ethyl-Ketone (MEK);
- an acetone; and
- an alcohol.

Claim 53. (Previously Presented) The printed circuit board of claim 51, wherein said boron nitride comprises one or more of the group consisting of:

- hexagonal boron nitride; and
- diamond boron nitride.

Claim 54. (Previously Presented) The printed circuit board of claim 47, wherein the thermal loading material comprises a 0.1-10 micron boron nitride powder.

Claim 55. (Previously Presented) The printed circuit board of claim 47, wherein said dielectric coating has a combination of viscosity and adhesion to prevent dewetting when said dielectric dispersion is applied to surfaces of the printed circuit board.

Claim 56. (Previously Presented) The printed circuit board of claim 47, wherein said suspension of said thermal loading material is substantially uniform when said dielectric dispersion is applied to said printed circuit board surfaces.

Claim 57. (Previously Presented) The printed circuit board of claim 47, wherein said dispersion further comprises one or more of the group consisting of:
at least one photosensitizing agent to enable said dispersion to be UV cured; and
at least one heat-curing agent to enable said dispersion to be temperature cured.

Claim 58. (Previously Presented) The printed circuit board of claim 57, wherein said photosensitizing agent is a UV-curable acrylic.

Claim 59. (Previously Presented) The printed circuit board of claim 57, wherein said heat-curing agent is anhydride.

Claim 60. (Previously Presented) The printed circuit board of claim 45, wherein the thermal loading material is 10%-80% and the binder is 90%-20% by weight of the thermally conductive dielectric dispersion.

Claim 61. (Previously Presented) The printed circuit board of claim 45, wherein the thermal loading material comprises a 100 mesh, 99% corundum, alpha-phase aluminum oxide powder.

Claim 62. (Previously Presented) The printed circuit board of claim 45, wherein the thermally conductive dielectric coating has a viscosity of at least 45" #2 Zahn Cup (full body).

Claim 63. (Previously Presented) The printed circuit board of claim 45, wherein the thermally conductive dielectric coating has a viscosity in the range of 50-100" #2 Zahn Cup (full body).

Claim 64. (Previously Presented) The printed circuit board of claim 45, wherein the thermally conductive dielectric coating has an adhesion that enables it to pass the ASTM D-3359-97 Method A Tape Test using a 1" (25 mm wide) semi-transparent pressure-sensitive tape with an adhesion strength of 25-70 ounces per inch when tested in accordance with ASTM Test Method D-3330.

Claim 65. (Previously Presented) The printed circuit board of claim 45, wherein the thermally conductive dielectric coating has a thickness of approximately .0015 to .0020 inches.

Claim 66. (Previously Presented) The printed circuit board of claim 45, wherein the thermally conductive dielectric coating is formed from multiple applications each forming a layer of thermally conductive dielectric material having a thickness of approximately .001 inches.

Claim 67. (Previously Presented) The printed circuit board of claim 45, wherein said dielectric coating has a combination of viscosity and adhesion sufficient to enable said dispersion to be applied via atomization spray techniques.

Claim 68. (Previously Presented) The printed circuit board of claim 45, wherein the thermal loading material has a conductivity of at least 20 W/mK.

Claim 69. (Previously Presented) The printed circuit board of claim 45, wherein the thermal loading material has a conductivity of at least 100 W/mK.

Claim 70. (Currently Amended) A printed circuit board (PCB) comprising:

- a printed wiring board;
- a plurality of components mounted on the printed wiring board; and
- an electrically continuous EMI protective shield conforming with surfaces of the printed circuit board comprising:
 - a contiguous, solid, thermally conductive dielectric coating, adhered to surfaces of the printed circuit board, comprising an electrically nonconductive thermal loading material; and
 - a conductive coating adhered to surfaces of the dielectric coating.

Claim 71. (Previously Presented) The printed circuit board of claim 70, wherein the thermal loading material comprises one or more of the group consisting of boron nitride (BN), aluminum oxide (AlO_3) and magnesium oxide (MgO).

Claim 72. (Previously Presented) The printed circuit board of claim 70, wherein the thermally conductive dielectric coating is formed from a thermally conductive dielectric dispersion comprising:

- a base liquid;
- a binder material suspended in the base liquid; and
- the electrically nonconductive thermal loading material suspended in the base liquid.

Claim 73. (Previously Presented) The conformal EMI shield of claim 72, wherein the binder material comprises one of the group consisting of acrylic and urethane.

Claim 74. (Previously Presented) The conformal EMI shield of claim 72, wherein the base liquid and binder material are provided in an intermediate dispersion subsequently doped with the thermal loading material.

Claim 75. (Previously Presented) The conformal EMI shield of claim 72, wherein the base liquid is one of either water or an organic solvent.